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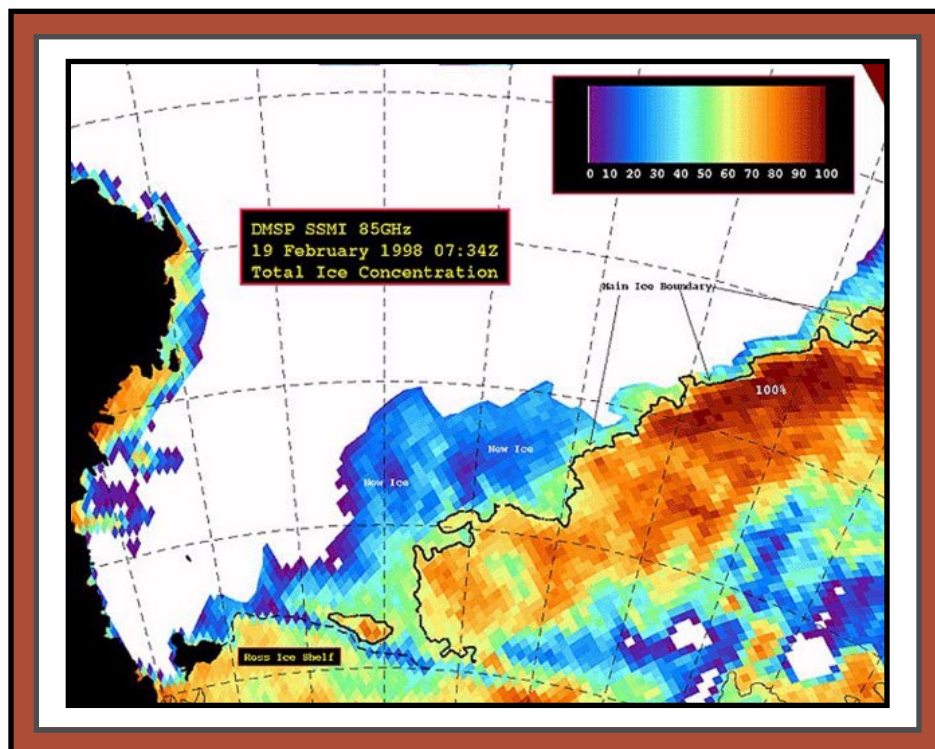
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By extracting data recorded by instruments aboard the U.S. Air Force Defense Meteorological Satellite Program (DMSP) satellite and using data from Special Sensor Microwave/Imager (SSM/I), Robert H. Whritner of the Arctic and Antarctic Research Center (AARC) at Scripps Institution of Oceanography (University of California at San Diego) produced an image that portrays the ice conditions in the Ross Sea on 19 February 1998, near the end of a *Nathaniel B. Palmer* research cruise. This image was processed using the high-frequency (85-giga-hertz) portion of the SSM/I and gave researchers onboard the *Palmer* an accurate picture of the overall ice concentrations. The SSM/I can see the ice even when clouds cover most of the antarctic ice edge and even when the ice cannot be seen by visible and infrared means. The software used to extract the high-frequency data was developed at AARC at Scripps Institution. Robert H. Whritner, Elizabeth Nelson, and Dan Lubin describe the work of AARC in an article in this issue: "Arctic and Antarctic Research Center: Support for research during 1996–1997."

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The *Antarctic Journal* is a medium for information about, and related to, the U.S. Antarctic Program. NSF welcomes ideas for improvement. Send comments to Winifred Reuning at WReuning@nsf.gov (e-mail) or Editor, *Antarctic Journal*, Office of Polar Programs, National Science Foundation, 4201 Wilson Boulevard, Arlington, Virginia 22230 (703-306-1033).

The *Antarctic Journal* invites contributions from members of the antarctic science, logistics, and policy communities who want to communicate their work and ideas to an audience of specialists and scientifically literate nonspecialists. The *Antarctic Journal* is not peer reviewed. It provides reports on U.S. activities in Antarctica and related activities elsewhere and on trends in the U.S. Antarctic Program. The [author guidelines](#) explain the requirements for articles submitted for publication.

The Arctic and Antarctic Research Center: Support for research during 1996–1997

Robert H. Whritner, Elizabeth Nelson, and Dan Lubin, Scripps Institution of Oceanography, University of California at San Diego, La Jolla, California 92093-0214

During 1996 and 1997, the [Arctic and Antarctic Research Center \(AARC\)](#) at the Scripps Institution of Oceanography provided satellite remote sensing data and data-analysis services to polar researchers worldwide. The AARC receives high-resolution picture telemetry (HRPT) data from the [National Oceanographic and Atmospheric Administration \(NOAA\)](#) and [Defense Meteorology Satellite Program \(DMSP\)](#) telemetry from the U.S. Air Force polar orbiters (Van Woert et al. 1992). The numerous uses of these remote-sensing data for polar research and operations in all disciplines are discussed by Massom (1991) and by King and Turner (1997).

These data are collected by National Science Foundation–maintained antennas at two land-based antarctic sites (Palmer and McMurdo Stations). The AARC also receives data from the U.S. Coast Guard icebreakers *Polar Sea* and *Polar Star* when these ships are operating north or south of 50° latitude. The data are sent to the AARC periodically as raw digital telemetry on magnetic media, but much of the AARC’s work is also done by logging directly into the satellite-tracking computer at McMurdo via the T1 line. The satellite-tracking facilities, as well as the AARC image-processing laboratory at the Scripps Institution of Oceanography, are based on the [SeaSpace Corporation](#) (San Diego, California) TeraScan and TeraVision hardware and software. The AARC also (and primarily) supports researchers who do not themselves possess this specialized software. The AARC’s involvement with polar research has encompassed a wide variety of disciplines, including atmospheric sciences (26 percent of all AARC users as of late 1997), polar oceanography (7 percent), sea-ice research (25 percent), glaciology (7 percent), geophysics (5 percent), polar biology (23 percent), and space science (7 percent). The table lists the total number of HRPT and DMSP overpasses in the AARC archive.

Between the two land-based sites, geographic coverage of the continent is nearly complete, with some gaps on the Indian Ocean side. The table is complete as of 2 August 1997 for McMurdo HRPT data, 8 June 1997 for McMurdo DMSP data, and 19 September 1997 for all Palmer data. There is a total of 72,910 satellite overpasses in the archive. For the earlier years, some of the table entries have changed from our last report (Whritner, Nelson, and Lubin 1995), because some data have been rescued from older media, as discussed below. In addi-

<i>The number of HRPT and DMSP overpasses archived at the AARC as of 19 September 1997</i>		
Year	HRPT	DMSP
1985	44	0
1986	78	0
1987	130	0
1988	604	0
1989	612	0
1990	1,954	0
1991	3,008	1,264
1992	5,151	3,502
1993	6,083	4,187
1994	6,195	6,769
1995	6,819	5,263
1996	6,887	6,704
1997	4,238	3,418

tion to providing this historical archive, the AARC has maintained the real-time data-processing and reduction services described in our last report.

During the past 2 years, the AARC has greatly expanded the use of its World Wide Web page (<http://arcane.ucsd.edu>). The entire AARC data catalog can be accessed through a graphical search program, which will provide the user with the number and specific listings of satellite overpasses for a specific antarctic region and time period. Sample images are available at <http://arcane.ucsd.edu/aarc.pages/img.html>. Also, many of the specialized data-reduction and -analysis projects provided to the international community have been delivered over the World Wide Web. One example during 1997 was a large advanced very-high-resolution radiometer (AVHRR) image processing project completed for Antarctica New Zealand (ANZ).

ANZ wanted 9 years' worth of clear-sky scenes over the Cape Roberts area, to determine seasonal dependence in sea-ice conditions. This information was necessary to plan geological drilling operations, because ANZ is heading an international field program, the [Cape Roberts Project](#). For the years 1987–1997, clear-sky image data were provided covering May through September. AARC personnel inspected all available overpasses to find clear sky scenes, and an example is shown in figure 1.

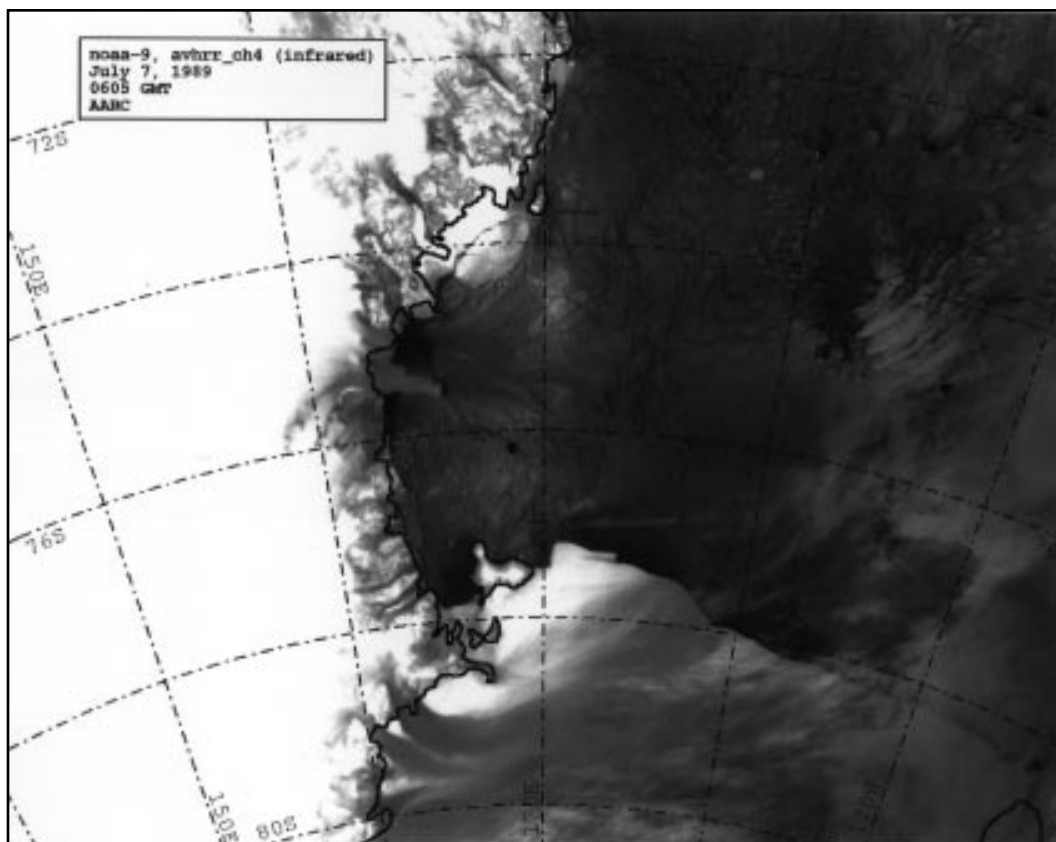


Figure 1. Example of HRPT support given by the AARC to Antarctica New Zealand. This clear-sky AVHRR infrared image was obtained on 7 July 1989 and shows the structure of the ice floes in the Cape Roberts region at 2-kilometer spatial resolution. (GMT denotes Greenwich mean time.)

Throughout 1996–1997, the AARC continued to provide regular sea-ice mapping support to the antarctic research vessels *Polar Duke* and *Nathaniel B. Palmer*. Sea-ice maps were provided at 30-kilometer spatial resolution using the National Aeronautics and Space Administration (NASA) team algorithm (Cavalieri et al. 1991) and also at 12.5-kilometer spatial resolution using the 85.5-gigahertz channels of the DMSP special sensor microwave imager (SSM/I). The 85.5-gigahertz SSM/I brightness temperatures are influenced by tropospheric cloud cover more than those from the lower frequency channels used by the NASA team algorithm. As a result of our participation in the 1994 Arctic Ocean Section (Aagaard et al. 1996), however, we have gained more confidence and experience with the use of 85.5-gigahertz data for sea-ice mapping (Lubin et al. 1997). Generally speaking, our 85.5-gigahertz SSM/I sea-ice maps provide better location of the ice edge for cruise-planning purposes, whereas the NASA team algorithm provides more accurate estimates of total sea-ice concentration over large geographic areas (e.g., Cavalieri et al. 1997). Figure 2 shows an example of an 85.5-gigahertz SSM/I sea-ice map generated at the AARC for Scripps Institution of Oceanography research scientist Gregory Mitchell, in support of the 1997 [Joint Global Ocean Flux Study \(JGOFS\)](#) antarctic cruises of the research vessels *Nathaniel B. Palmer* and *Roger Revelle*.

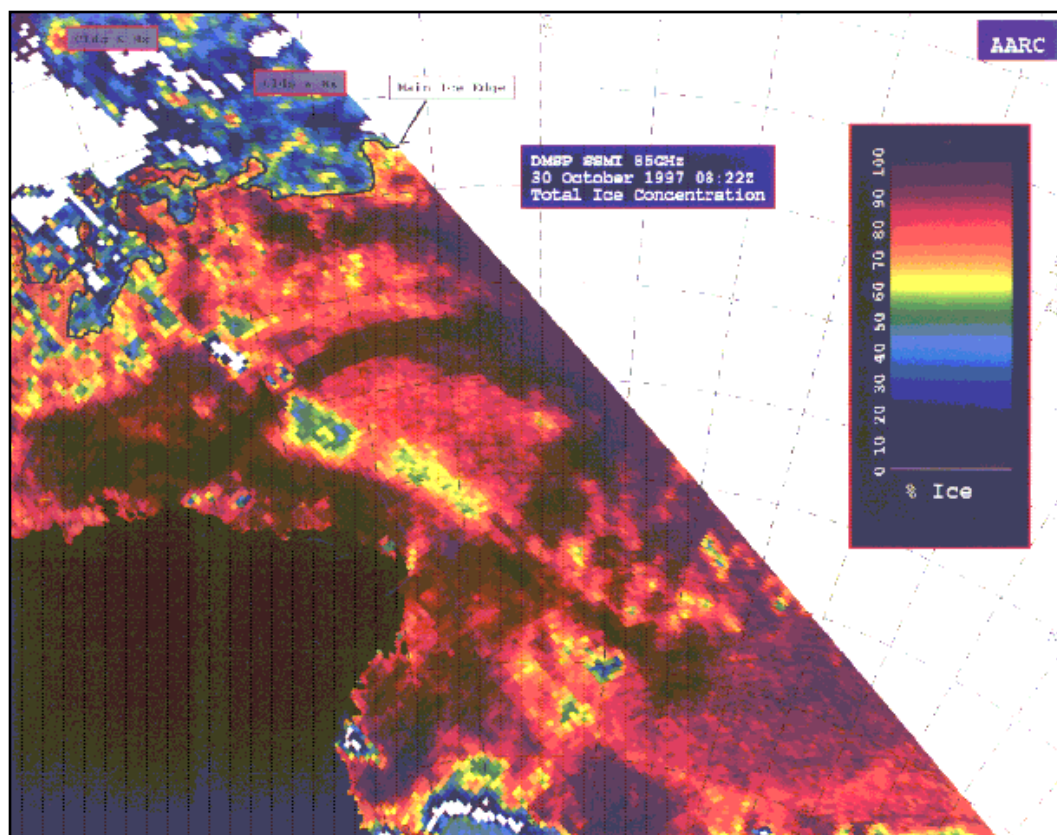


Figure 2. Example of a total sea-ice concentration image provided by the AARC to the Joint Global Ocean Flux Study (JGOFS). The ice concentration is mapped at 12.5-kilometer spatial resolution using the 85.5-gigahertz (GHz) channels of the SSM/I instrument aboard the U.S. Air Force polar orbiters.

The AARC has also taken important steps to safeguard the large archive of antarctic satellite data. By the end of 1996, all of the AARC data had been migrated to modern 4-millimeter (mm) Hewlett-Packard compression format tapes. Prior to 1996, digital satellite telemetry at the AARC resided on two types of 4-mm media (Hewlett-Packard and WangDat compressions), 8-mm (Exabyte) tapes, and old 9-track tapes, depending on the original source in the Antarctic. Migration to a common format has (most important) rescued older data from loss through media deterioration and has made access to all data more efficient. In total, 1,327 WangDat tapes, 569 8-mm tapes, and 100 9-track tapes were copied over to accomplish this. The AARC has also been making copies of raw telemetry for the National Snow and Ice Data Center (NSIDC) on a regular basis for specific regions and time periods as requested by NSIDC. The AARC's mandate is to provide satellite data and support with interpretation to interested researchers at no cost to the user, although for large data requests, the user is asked to cover the cost of magnetic media.

Support for the AARC commenced with National Science Foundation grant DPP 88-15818 and continued with subsequent supplements. The AARC presently operates with support from National Science Foundation grant OPP 94-14276.

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South Pole Station safety upgrades and modernization begin

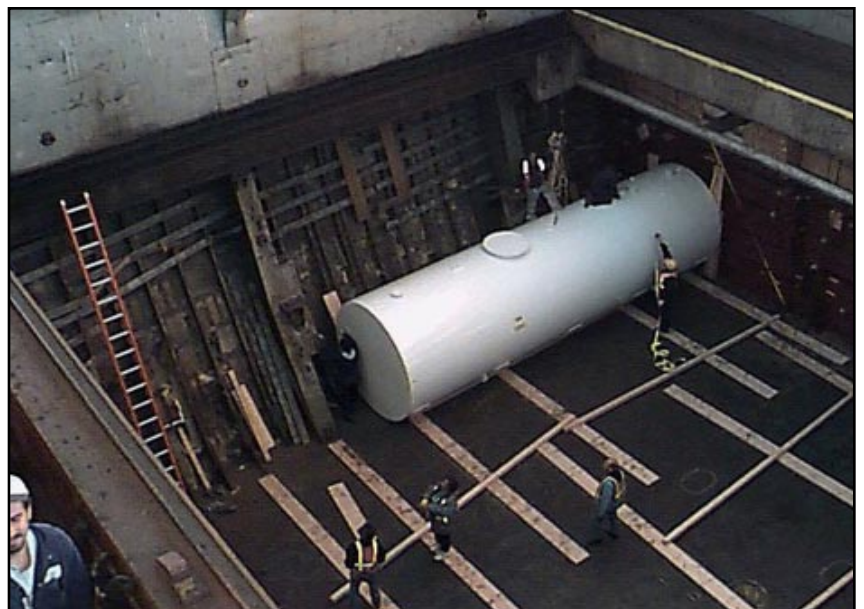
On a dock at Port Hueneme, California, 45 new metal fuel tanks wait to be loaded aboard the antarctic supply ship *Greenwave* in late 1997, enroute to



Amundsen–Scott South Pole Station. These 10,000-gallon, single-walled tanks, which were custom built, are part of U.S. Antarctic Program's effort to make operations at the station safer and more environmentally sound. Purchased with funds allocated during fiscal 1997 for the South Pole Safety and Environment Project and some additional funds from fiscal 1998 for the South Pole Modernization Project, the new steel fuel tanks will replace the rubber fuel bladders that

have been traditionally used at some U.S. antarctic stations to store fuel.

After being loaded onto the *Greenwave*, the tanks were delivered to McMurdo Station in early February, as part of the annual supply mission. By 13 February six of the scheduled 15 tanks had been flown from McMurdo Station to the South Pole, leaving nine scheduled to be delivered before the station began winter operations. The remaining tanks will be delivered to the South Pole in the early part of the 1998–1999 austral summer.



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Once at the Pole, the tanks and the red spill-containment “boats” will be placed in the fuel arches that currently house the eight 25,000-gallon rubber fuel bladders. The spill-containment boats are arranged side-by-side, with one tank placed in each boat. Then a second row of tanks is stacked on top to complete the arrangement. The fuel storage project is scheduled to be completed during the 1998–1999 austral summer.



***Hero* needs a home**

The 37.5-meter, ice-strengthened research ship *Hero*, which supported NSF-funded scientists in Antarctica from 1968 to 1984, is available for transfer to a non-profit organization or for sale. The ketch-rigged motor sailor, no longer owned by the National Science Foundation, is offered by the International Oceanographic *Hero* Foundation. The *Hero* Foundation acquired the *Hero* after the Port of Umpqua of Reedsport, Oregon, obtained the ship through the Federal Surplus Property program in 1984. For years, the *Hero* Foundation enriched appreciation and understanding of the Antarctic by giving tours of the ship to tourists and school children.



In recent years, interest in the *Hero* has declined, and last year, the *Hero* Foundation was dissolved. As a result, the Oregon Department of Justice is assisting with the wind up of *Hero* Foundation affairs, including the transfer of this sole asset. The ship is unique and a part of antarctic history. The Oregon Department of Justice says that only someone with knowledge of ships and ample funds will be able to restore *Hero*. Any future use will have to include its removal from the current berth (shown) in Reedsport.

For information, or to make a suggestion, contact Judith Woodruff, Assistant Attorney General, Charitable Activities Section, Oregon Department of Justice, at 503-229-5725 or judith.woodruff@doj.state.or.us.

Please do not contact the National Science Foundation. NSF is no longer involved with the *Hero* and is not able to provide further information.

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Charitable Activities Section
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Was Antarctica an
important Cretaceous link
between South America
and India–Madagascar?

Marine geophysical data
on Antarctic–African
tectonic plate boundary
reveal an undersea
wonder

Science notebook—News from Antarctica and beyond

Marine geology/geophysical cruises use new techniques to chart antarctic climate history

Participants in the internationally supported [Ocean Drilling Program \(ODP\)](#) returned to antarctic waters for the first time in 10 years in December 1997. Working aboard the drilling ship *JOIDES Resolution*, researchers will conduct two 56-day investigations. The first cruise (Leg 177), which began on 15 December 1997 and ended on 9 February 1998, focused on the southern Atlantic region of the southern oceans, and the second (Leg 178), scheduled to begin in mid-February 1998, focuses on the Pacific margin of the Antarctic Peninsula. Funded principally by the National Science Foundation with substantial contributions from international partners, ODP supports basic research into the history of the ocean basins and the nature of the crust beneath the ocean floor.

During Leg 177, 25 investigators from nine nations collected sediment cores, hoping to unearth 40- to 50-million-year-old material from the ocean bottom and, with it, to unlock the key to the region's [paleoclimate](#). The cruise, which left from Capetown, focused on six sites across the southern oceans, the deepest of which was expected to be 700 meters below the seafloor. The southernmost drill site was near Bouvet Island, a Norwegian possession and the world's most remote island. The cruise ended on 9 February 1998 in Punta Arenas, Chile.

The team's goal is to reconstruct the climate history of the high-latitude region of the Southern Hemisphere using recently developed techniques and modern drilling methods not available to researchers who participated during the last ODP investigation a decade ago. Aboard the *JOIDES Resolution*, the world's largest research ship, the team will study the history of the antarctic ice build up. This research will help scientists better understand when the massive antarctic ice sheet—the largest accumulation of ice on Earth—formed and how stable it has been.

According to David A. Hodell of the University of Florida, co-chief scientist of Leg 177, "The build up of the antarctic ice sheet around 40 million years ago led to dramatic changes in the Earth's climate system and biosphere. Earth's climate changed from a relatively warm 'hothouse' world to a cold 'icehouse' world." Scientists know that the southern oceans have a major role in defining the Earth's climate system, but many questions remain about the history of climate and ocean changes in the southern high-latitudes.

"The ability to resolve short-term climate change depends on how fast the sediments accumulate on the seafloor," Hodell explains. "We will drill in zones of high sediment accumulation rates in order to resolve climatic changes that lasted for centuries to millennia. Recovery of sediment cores deposited at high rates will permit a direct comparison of marine and ice-core records to understand how the ocean-atmosphere system behaved during the last four cycles of glacial-to-interglacial climate change."

Leg 178, which begins in mid-February in Punta Arenas, Chile, is designed to provide a high-resolution record of antarctic continental climate over the past 6 to 10 million years (the Cenozoic) and to directly check the relationship between the global sea-level changes and the waxing and waning of the antarctic ice sheet. The research to be conducted during this cruise is part of a larger effort to better understanding of antarctic glacial history, particularly the stability of the antarctic ice sheet.

Was Antarctica an important Cretaceous link between South America and India–Madagascar?

Small, ratlike creatures that once roamed with the dinosaurs are providing clues to ancient continent migration, suggesting that in Earth's distant past, Antarctica may have been a bridge that enabled animals to migrate from South America to Indo-Madagascar.

The 65- to 70-million-year-old mammals called *gondwanatheres* had distinctive high-crowned teeth. Until recently, scientists had found these teeth only in South America. In the 4 December issue of *Nature*, however, paleontologist David Krause of the State University of New York at Stony Brook announced that he and his [National Science Foundation-funded](#) team of researchers have found gondwanathere teeth in 80-million-year-old rocks in Madagascar and slightly younger rocks in India.

“Finding representatives of gondwanatheres on these now widely separated land masses suggests to us that the land masses were connected in the Late Cretaceous,” said Krause of the discovery. “A recently proposed geophysical model shows that India and Madagascar were attached to eastern Antarctica well into the Cretaceous while South America was attached to the western end of Antarctica. This discovery supports that hypothesis with totally independent evidence derived from the fossil record.”

Christopher Maples, program director for the National Science Foundation's Division of Earth Sciences, which funded Krause's research, commented on the far-reaching implications of the find. “These are major discoveries that go far beyond their obvious significance to paleontologists,” Maples said. “Krause and his...team have provided an excellent example of the contributions that paleontology can make to many areas of geoscience, including tectonic plate positions in Earth's past.”

Marine geophysical data on the Antarctic–African tectonic plate boundary reveal an undersea wonder

In the waters between Africa's Cape of Good Hope and the Antarctic, a multinational marine geophysical team—called *InterRidge*—mapping the Southwest Indian Ridge, the boundary between the Antarctic and African tectonic plates, has found the steepest underwater cliff ever recorded. InterRidge used remote sensing devices to map a 2,000-kilometer section of the ridge, focusing on a 650-kilometer-long segment between 15°E and 25°E, a previously uncharted region.

[John Madsen](#), a University of Delaware geologist, reported InterRidge's findings at the 1997 Fall Meeting of the American Geophysical Union, held in December in San Francisco. The ridge drop discovered by the InterRidge team plunges from 150 meters to 6,000 meters in only 16 kilometers. "It's the steepest change in elevation along the mid-ocean ridge that's been mapped any place on the globe," Madsen reports. The mid-ocean ridge encircles the entire Earth.

The maps produced by the InterRidge team will help scientists understand the physical characteristics of the sea and the ocean floor. The early work of this team suggests that unusual geologic activity and volcanic processes are at work along the Southwest Indian Ridge.

"Some biologists believe life may have originated at hydrothermal vents beginning at 10,000 feet [3,000 meters] below the surface," Madsen notes. At that depth, the temperature of the ocean water is close to freezing, and when the 340°C flow from seafloor vents hits the near-freezing ocean water, sulfide deposits are formed. Some scientists believe these deposits may hold the key to the beginnings of life on Earth. "We'll be making maps of the seafloor for people interested in finding these vents," says Madsen, whose work is supported in part by a National Science Foundation [grant](#).

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More than 208,000 antarctic and arctic bibliographic records, many containing abstracts, can be searched online at this site. The Cold Regions Bibliography Project, sponsored and financially supported by the National Science Foundation's Office of Polar Programs and the U.S. Army Cold Regions Research and Engineering Laboratory (CRREL), is part of the Library's Science and Technology Division, which, since 1995, has also been collaborating with the Scott Polar Research Institute, Cambridge, England. For over 40 years, the LOC staff has updated and maintained materials on science and technology in the world's cold regions as part of its mission to disseminate information on Antarctica and cold regions science and technology. This effort was begun in the 1950s under sponsorship of CRREL; the National Science Foundation joined as a cosponsor for antarctic material in 1962.

For direct access to the database, as well as more information on this project, go the project's homepage at <http://lcweb.loc.gov/rr/scitech/coldregions/welcome.html>. Annual compilations of new antarctic accessions are published in the *Antarctic Bibliography*, which may be purchased from the [Superintendent of Documents](#), Government Printing Office, Washington, D.C., 20402. *Current Antarctic Literature*, a monthly list of indexed abstracts, is available at the CRREL library web site, <http://www.crrel.usace.army.mil/library/aware/antlit.htm>. (See below for February's highlights.) Uncopyrighted items cited in *Current Antarctic Literature* are available from the Library of Congress, Photoduplication Service, Washington, D.C. 20540.

Suggestions for items to be cited are welcome (crbp@loc.gov). Please include complete bibliographic information. Suggested items should be consistent with the project's Sponsor Interest Profiles and Selection Criteria, on the Cold Regions Bibliography Project home page. For the Antarctic, the National Science Foundation's interests are geographic (limited to the antarctic region) but cover all science disciplines. Comments about antarctic bibliographic materials may be sent to the Cold Regions Bibliographic Project (crbp@loc.gov) or the National Science Foundation (gguthrid@nsf.gov).

Current Antarctic Literature February 1998 highlights

The February *Current Antarctic Literature* cites and abstracts 134 antarctic research papers from around the world. Twenty of the 134 are highlighted below. For all 134 bibliographic citations and abstracts, see <http://www.crrel.usace.army.mil/library/aware/antlit.htm>. Search the whole Cold Regions Bibliography Project database at the Library of Congress: <http://lcweb.loc.gov/rr/scitech/coldregions/welcome.html>.

There are differences in UVR survival strategies even between closely related species of cyanobacteria.....	B-58451
Notothenioid cardiovascular physiology provides important information on their organismal performance, adaptation, and species diversification	B-58463
A database on antarctic lichens, called VICTORIA, was installed at the Department of Biology, University of Trieste, Italy	B-58469
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Whole spores of the fungus <i>Arthrobotrys ferox</i> show 3 main fluorescence bands undergoing substantial changes after UV-B and UV-C irradiation	B-58483
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Geological samples recovered in the Victoria Land Basin present evidence of the late Ross Ice Shelf advance and retreat history	E-58367
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Sedimentologic and geochemical analyses of a high-resolution sediment core collected in Lallemand Fjord represent the most detailed record of Holocene climate change in Antarctica.....	E-58413
Textural evidence suggests that bow shocks and high thermal gradients existed during deceleration of micrometeoroids in the atmosphere	E-58432
It is possible to link quantitatively the atmospheric aerosol mass loading from a low-latitude volcanic eruption to its signal in polar ice cores	F-58383
A dark line appearing on a recent satellite image of McMurdo Ice Shelf does not indicate an opening crevasse but a firn collapse over sea water soaking horizontally into the ice shelf.....	F-58426
In the Antarctic Peninsula, backstress from pinning points and ice rises appears to be important in stabilizing the calving terminus.....	F-58440

The Network for Detection of Stratospheric Change is a set of high quality ground-based observing stations, including 3 antarctic sites: McMurdo Station, Arrival Heights, and D. d’Urville Station.....I-58400

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The arctic vortex moves further off the pole, is generally more elongated, and has a more complicated vertical structure than the antarctic vortex.....I-58431

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Heat flow density measurement with the analysis by scanning X-ray analyzed microscope is a useful method to investigate the fine structure of geological samples.....L-58368

Reliable data on gravity changes which cause polar motions are obtained with a superconducting gravimeter installed at Showa Station in March 1993.....L-58447

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K. Verosub, U.S. Antarctic Program researcher, honored by Carnegie Foundation

Kenneth Verosub, a professor of geology at the University of California–Davis and an antarctic researcher, was honored in October 1997 with a Professor of the Year award bestowed by the Carnegie Foundation for the Advancement of Teaching. **Verosub**, who is the first UC–Davis professor to win the coveted award for California, has taught at the university since 1975. His research focuses on the magnetic properties of sediments and sedimentary rocks. Most recently, he has received grants from the National Science Foundation's Office of Polar Programs for research related to the Cape Roberts project (“**Paleomagnetic and mineral magnetic characterization of drill cores from the Cape Roberts Project**” and “**Paleomagnetic and mineral magnetic studies in anticipation of the Cape Roberts Project**”).

In 1988, Verosub was awarded the UC–Davis Distinguished Teaching Award, and in 1996, he received a \$30,000 UC–Davis Prize for Undergraduate Teaching and Scholarly Achievement from the UC–Davis Foundation.

The Professor of the Year awards are sponsored in cooperation with the Council for Advancement and Support of Education.

Laurence M. Gould makes first antarctic cruise

On Christmas Day, the *Laurence M. Gould*, the National Science Foundation's new research ship, left Louisiana for Punta Arenas, Chile. The *Gould* passed through the Panama Canal on 2 January and arrived at Punta Arenas on 16 January. While en route, crews from Antarctic Support Associates, support contractor for the National Science Foundation, and Edison Chouest Offshore, the firm that built the *Gould*, performed final ship testing and made underway equipment assessments. The *Gould* replaces the *Polar Duke*, which in 1997 completed 13 years of service in support of antarctic science. (See the tribute to the *Duke* at <http://hahana.soest.hawaii.edu/pduke/polarduke.html>.)

After an exceptionally smooth crossing of the Drake Passage, the *Gould* arrived at Palmer Station, Antarctica, at 11 a.m. on 26 January 1998. The *Gould's* first science cruise began 2 days later when it left Palmer carrying researchers from the Long-Term Ecological Research (LTER) project for research in the Bellingshausen Sea.

Instruments and data retrieved from long-duration balloon

Four days after the 7 January launch of a massive data-gathering balloon from McMurdo Station, Antarctica, by personnel from the **National Scientific Balloon Facility**, the flight had to be terminated. The balloon, which is capable of carrying over 2,200 kilograms of payload into the stratosphere for a nearly unobstructed view of outer space, had a “flawless” launch, according to project coordinator Steven Peterzen, and was supposed to stay aloft for 20 days, circumnavigating the entire continent. Researchers and balloon experts speculate that the

skin of the balloon probably developed a tear, causing it to drop below the minimum altitude needed to conduct the planned research.

The balloon carried a high-resolution gamma-ray and hard x-ray spectrometer (**HIREGS**) to view and record the gamma-ray and x-ray portions of the electromagnetic spectrum in the galaxy. HIREGS is designed to

- determine the conditions for positron annihilation line radiation from the galactic center region,
- study emissions from galactic nucleosynthesis, and
- study transient positron annihilation radiation from black-hole sources in the galactic region.

In addition, a prototype Pulse-Shape-Discrimination system for background discrimination was tested on the flight.

“From a science perspective, the flight was a success,” said Peterzen. Within 12 hours of launch, researchers began receiving useful data. “Scientists still got more out of a 4-day flight than any conventional flight.” By comparison, data gathered from a Space Shuttle flight might comprise only a few hours of observation time. “From the start,” Peterzen says, “things are against you here in Antarctica. We’re talking about floating a balloon made of ultrathin fabric around the continent. So much can go wrong; that’s why any success, whatever its size, is so sweet.”

When the balloon began to descend, Peterzen and his team sent it commands to release ballast in a series of efforts to maintain altitude, but the attempts failed. On 11 January, Peterzen decided to terminate the flight and sent a command to trigger a small explosive, collapsing the balloon. The balloon and gondola went into a brief free fall before the parachute opened and brought the scientific equipment safely to the ground near Vostok Station and automatic geophysical observatory 4 (AGO-4). The Air National Guard flew an LC-130 to the AGO-4 site and recovered the balloon’s payload.

South Pole Atmospheric Research Observatory dedicated

On 12 January, the Amundsen–Scott South Pole Station community gathered to dedicate the new Atmospheric Research Observatory (ARO). Joseph Bordogna, Acting Deputy Director of the National Science Foundation; D. James Baker, the Administrator of the National Oceanic and Atmospheric Administration (NOAA)

and the Under Secretary of Commerce for Oceans and Atmosphere at the Department of Commerce; and David Hofmann, Director of NOAA’s [Climate Monitoring and Diagnostics Laboratory](#) in Boulder, Colorado, participated in the dedication.



The new Atmospheric Research Observatory at Amundsen–Scott South Pole Station. Photograph by Jerry Marty, U.S. Antarctic Program.

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ARO, which replaces the old Clean Air Facility, is located in the northeast sector of South Pole Station, an area receiving prevailing winds that have traveled thousands of kilometers without direct human influence. Even planes flying in and out of South Pole are kept downwind of the facility to avoid contaminating the air, which is the cleanest in the world. Among projects housed in ARO are air-monitoring instruments for NOAA's Climate Monitoring and Diagnostics Laboratory, the University of Illinois lidar experiment that is measuring the vertical structure and dynamics of the lower stratosphere, Biospherical Instruments' UV-monitor, and instruments measuring effluent aerosols upwind and downwind from South Pole Station. Completed in 1997, ARO has served as the base for these experiments for just under 1 year.

D. James Baker (right), Under Secretary of Commerce for Oceans and Atmosphere and Administrator of the National Oceanic and Atmospheric Administration (NOAA), and David Hoffman (left), Director of NOAA's Climate Monitoring and Diagnostics Laboratory in Boulder, Colorado, are shown here inside the new laboratory with the NOAA flag.

Photo by Jerry Marty, U.S. Antarctic Program.



Biology and medicine

Geology and geophysics

Ocean and climate
studies

Aeronomy and
astrophysics

Glaciology

Services and support

Foundation awards of funds for antarctic projects, 1–31 December 1997

Below, the prefix OPP indicates that the Office of Polar Programs initiated the award. The first dollar figure is the amount provided by the initiating program. Dollars in parentheses indicate the total award amount. Click to the National Science Foundation database for details and award description, including duration of award. Awards not linked to an abstract have not been posted to the database yet.

Biology and medicine

Smith, Walker O. University of Tennessee–Knoxville, Knoxville, Tennessee. Management and scientific services in support of the U.S. Joint Global Ocean Flux Study (JGOFS) southern ocean study: Nutrients. [OPP 95-30382](#). \$110,658. (\$1,271,832)

Geology and geophysics

Case, Judd A. St. Mary's College, Moraga, California. Maestrichtian land mammals of Vega Island, Antarctic Peninsula. [OPP 96-15933](#). \$24,440. (\$38,558)

Crowley, Thomas J. Texas A&M University, College Station, Texas. Modeling Paleozoic glaciations. [OPP 96-15011](#). \$74,250. (\$170,450)

LeMasurier, Wesley E. University of Colorado–Denver, Denver, Colorado. Late Cenozoic volcanism in Marie Byrd Land: Assessing petrogenic and eruptive mechanisms by comparative studies of analogs. [OPP 97-20411](#). \$45,745.

Wise, Sherwood W. Florida State University, Tallahassee, Florida. Curatorship of antarctic collections. [OPP 97-43970](#). \$127,275.

Ocean and climate studies

Anderson, Robert F. Columbia University, New York, New York. Management and scientific service in support of the U.S. Joint Global Ocean Flux Study (JGOFS) southern ocean process study: Hydrography, coring, and site survey. [OPP 95-30398](#). \$251,807. (\$1,658,129)

Gordon, Arnold L. Columbia University, New York, New York. Deep Ocean Ventilation Through Antarctic Intermediate Layers (DOVETAIL). [OPP 95-28807](#). \$256,459. (\$427,215)

Matano, Ricardo P. Oregon State University, Corvallis, Oregon. Deep Ocean Ventilation Through Antarctic Intermediate Layers (DOVETAIL). [OPP 95-27695](#). \$85,433. (\$175,577)

Smith, Walker O. University of Tennessee–Knoxville, Knoxville, Tennessee. Management and scientific services in support of the U.S. Joint Global Ocean Flux

Study (JGOFS) southern ocean study: Nutrients. [OPP 95-30382](#). \$32,719. (\$1,271,832)

Aeronomy and astrophysics

LaBelle, James W. Dartmouth College, Hanover, New Hampshire. High-latitude electromagnetic wave studies using antarctic automatic geophysical observatories (AGOs). [OPP 96-15138](#). \$53,317. (\$108,528)

Piccirillo, Lucio. Bartol Research Institute, Newark, Delaware. Cosmology from Dome C in Antarctica. [OPP 96-16338](#). \$8,000. (\$16,000)

Glaciology

Brook, Edward J. Washington State University, Pullman, Washington. Thermal fractionation of firn air and the ice-core record of abrupt interstadial climate change. [OPP 97-25918](#). \$5,923. (\$9,871)

McIntosh, William C. New Mexico Institute of Mining and Technology, Socorro, New Mexico. Late Pleistocene inland west antarctic ice sheet elevations at Mount Takahe. [OPP 97-25910](#). \$166,797.

Nishiizumi, Kunihiko. University of California–Berkeley, Berkeley, California. Cosmogenic radionuclides in the Siple Dome ice core. [OPP 97-25257](#). \$118,400.

Severinghaus, Jeffrey P. Scripps Institution of Oceanography, La Jolla, California. Thermal fractionation of firn air and the ice core record of abrupt interstadial climate change. [OPP 97-25305](#). \$121,719. (\$202,865)

Taylor, Kendrick C. University of Nevada, Desert Research Institute, Reno, Nevada. Electrical and optical measurements on the Siple Dome ice core. [OPP 95-26420](#). \$91,982. (\$171,104)

Zumberge, Mark A. Scripps Institution of Oceanography, La Jolla, California. Ice dynamics, the flow law, and vertical strain at Siple Dome. [OPP 96-15454](#). \$44,538. (\$135,005)

Services and support

Britton, Mark C. Andrus Research Corporation, Arlington, Virginia. Imaging/application support for the Office of Polar Programs. [OPP 98-07381](#). \$145,816.

Kuivinen, Karl C. University of Nebraska–Lincoln, Lincoln, Nebraska. Logistic and engineering support by the Polar Ice Coring Office. [OPP 98-40212](#). \$1,504,985. (\$2,436,067)

Rosage, David J. National Aeronautics and Space Administration, Wallops Island, Virginia. Operational readiness review of Black Island telecommunications facility, McMurdo Station, Antarctica. [OPP 98-03372](#). \$111,000.